

May 14 & 15, 2008

**Montana Board of Research and Commercialization Technology
Board Meeting
502 South 19th, Bozeman, Montana
May 14 & 15, 2008**

Board Members Attending:

John Youngberg, Chairman
Marty Connell
Jim Davison
Michael Dolson
Todd Graetz
Larry Hall

Others Attending:

Dave Desch, Executive Director
Jane Todd, Administrative Specialist

I. Call to Order

Chairman John Youngberg called the meeting to order at 10:26 a.m.

II. Approval of Minutes

Chairman Youngberg asked for comments regarding the Minutes of the March 19, 2008, Board Meeting. There were no comments and Jim Davison moved to approve the Minutes. Seconded by Marty Connell, the Minutes were approved as presented.

III. Review and discussion of proposals submitted March 3, 2008

The Board discussed the procedure for reviewing proposals and the number of proposals to be reviewed. The Board then discussed the following projects and it was decided to put these in a "hold" category for the time being:

#09-04 Definition of Electrical Parameters Required for Effective Stimulation of
Peripheral Nerves by Indirectly Applied Electrical Fields
Philip Cory – NERVONIX, Inc. – Bozeman
\$9,000

#09-05 Remote Sensor for Methamphetamine Lab Detection
Wm. Randall Babbitt – Spectrum Lab – Montana State University – Bozeman
\$160,791

#09-06 Use of 100 Percent Fly Ash Based Concrete in Construction in Montana
Michael Berry – Western Transportation Institute/Civil Engineering Department –
Montana State University – Bozeman
\$88,494

#09-37 Developing Photolithographic Technology at an In-State Facility
William Suckow – AdvR, Inc. – Bozeman
\$100,977

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The Board then entered a discussion about its mission and how certain projects – those that apply an existing technology, or develop a facility that can be used to perform tasks for local companies – fit that mission. It was decided that it is the policy of the Board that funded projects should have a definitive research component.

#09-45 LITEOWL: Customizable Sensor-Based UAV's for Resource Management Applications

Mark Lorang – Flathead Lake Biological Station – University of Montana - Missoula
\$312,089

#09-60 A.L.E.R.T. Animal Location Evasive Response Technology System Miniaturization, Power and Communications Development and Implementation Plan

Brian Baran – Camrix Engineering Corporation – Belgrade
\$60,000

The Board discussed the following proposals in detail:

#09-01 Initial Clinical Pilot Trials and First-to-Market for Lipo-Effect

Jeff Golini – All American Pharmaceutical & Natural Foods Mfg. – Billings
\$145,000

The Board liked this project because:

- Business acumen of the PI
- State-of-the-art facility in Billings

The Board expressed concerns as follows:

- Lack of acceptable external peer reviews
- Proposal could be more clearly written.
- Unorthodox approach

#09-02 Structural Design for Product Improvement and New Commercial Applications of Silica Polyamine Composites

Edward Rosenberg – Department of Chemistry – University of Montana – Missoula
\$335,253

The Board liked this project because:

- Previously funded project are making progress and selling product.
- More applications for the technology

The Board expressed concerns as follows:

- Project has been previously funded.
- Substantial funding request
- Would like to see more company financial support

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#09-03 Wildfibre – A Hamilton, Montana Manufacturing Company
Jeff Burrows – Wildfibre, LLC – Hamilton
\$173,000

The Board expressed concerns as follows:

- Many similar products on the market

#09-07 Development of an ICP Etch Process for Nonlinear Optical Materials
Phillip Himmer – Montana Microfabrication Facility/ECE Department – Montana State University – Bozeman
\$78,728

The Board liked this project because:

- Potential to develop student expertise
- Continuation and support of infrastructure
- Enhance capability of research done by companies utilizing the facility/technology
- Potential benefit to the state
- Small amount of money to help research at the university

The Board expressed concerns as follows:

- Not an ideal fit for MBRCT program

#09-08 Enhancing the Protection and Safety of the Montana Wheat Production
Li Huang – Department of Plant Sciences & Plant Pathology – Montana State University – Bozeman
\$179,998

The Board expressed concerns as follows:

- Wheat rust is usually a problem in areas with a wetter climate than Montana.

#09-09 A Frequency Agile Digital Beamforming Antenna for WiMAX Radio Wireless Networks
Yikun Huang – Department of Electrical & Computer Engineering – Montana State University - Bozeman
\$160,234

The Board liked this project because:

- Well-written proposal
- Low cost
- Probability of success high
- Potential to expand broadband to rural areas

The Board expressed no particular concerns regarding this project.

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#09-10 Improving Camelina Seed Oils for Biodiesel Production

Chaofu Lu – Department of Plant Sciences & Plant Pathology – Montana State University – Bozeman
\$150,000

The Board showed no particular interest in this project.

The Board expressed concerns as follows:

- Commercialization plan could be more detailed.
- Significant problems with raising Camelina
- Competition with wheat

#09-11 Novel Camelina Oils for Biolubricants and Fuel Additives

Chaofu Lu – Department of Plant Sciences & Plant Pathology – Montana State University – Bozeman
\$130,500

The Board liked this project because:

- Creating a high-value product

The Board expressed concerns as follows:

- Competing with wheat and barley
- Significant problems with raising Camelina

#09-12 Materials for Nonlinear Optical and Electro-Optical Applications

Galina Malovichko – Physics Department – Montana State University – Bozeman
\$180,000

The Board showed no particular interest in this project.

The Board expressed no particular concerns with this project.

#09-13 Improving Milling and End Use Quality of Montana Wheat

John Martin – Department of Plant Sciences & Plant Pathology – Montana State University – Bozeman
\$139,260

The Board liked this project because:

- Strong peer reviews
- Supports addressing wheat quality

#09-14 Development of Adhesive Free Microjoining Technology for Applications in Miniaturized Devices

Ahsan Mian – Department of Mechanical & Industrial Engineering – Montana State University – Bozeman
\$257,828

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The Board liked this project because:

- Potential to license the process to other companies
- Near-term commercialization
- Strong peer reviews

The Board expressed concerns as follows:

- Process-related project versus project that develops a particular product

#09-15 Knowledge-Based Energy Management System for Microgrids with Multiple Renewable and Non-Renewable Distributed Generation Sources

M. Hashem Nehrir – Department of Electrical & Computer Engineering – Montana State University – Bozeman
\$203,299

The Board liked this project because:

- Necessary intellectual property for the state to capitalize on.

The Board expressed concerns as follows:

- Would like to have a better understanding of how the project differs from currently employed methods

#09-16 Utilization of Camelina Sativa Meal in Solid Biofuels and for Environmental Remediation

Alice Pilgeram – Biobased Institute/Place Science – Montana State University – Bozeman
\$160,000

The Board liked this project because:

- Two strong objectives – biofuel and environmental reclamation
- Highly focused in Montana over the long-term

The Board expressed concerns as follows:

- Could use more detailed commercialization plan
- Drawbacks of raising Camelina
- Competition with high price of wheat and durum

#09-17 Enhancing the Infrared Cloud Imager for Commercialization

Joseph Shaw – Electrical & Computer Engineering Department – Montana State University – Bozeman
\$225,237

The Board liked this project because:

- Credibility of PI
- Low-risk

The Board expressed concerns as follows:

- Not convinced that there is a big market

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- Technology looking for an application

#09-18 Solid Stem Wheat – A Unique Biofuel Source for Montana

Jamie Sherman – Department of Plant Sciences - Montana State University – Bozeman
\$60,000

The Board expressed concerns as follows:

- Do we know what kind of feedstock we need before we know what the conversion process will be?

#09-19 PDT Cancer Treatment Depth Efficacy Studies Using the Transplantable Rabbit VX2 Carcinoma

Jean Starkey – Department of Microbiology – Montana State University – Bozeman
\$60,000

The Board liked this project because:

- Proven track record
- Continuation of existing successful research
- Not a lot of money

The Board expressed no particular concerns.

#09-20 Development of Bismuth-Thiol Based Therapeutic Agents for Treating Chronic Wounds

Philip Stewart – Center for Biofilm Engineering – Montana State University – Bozeman
\$100,470

The Board liked this project because:

- University project where MSU will have intellectual property

The Board expressed concerns as follows:

- What is the ability of the corporate partner to commercialize this product?

The Board requested a presentation by the PI and the company principal.

#09-21 Heat-Tolerant Spring Wheat for Montana

Luther Talbert – Department for Biofilm Engineering – Montana State University – Bozeman
\$150,000

The Board liked this project because:

- Proposal explains MSU commercialization of seed varieties
- Strong peer review
- Well-written proposal

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The Board expressed concerns as follows:

- Reality of increasingly warmer weather

#09-22 A New Device for Investigating Biological Samples in Humid Environment
Using Atomic Force Microscopy

Zhiyong Suo – Physics Department – Montana State University – Bozeman
\$74,896

The Board liked this project because:

- Platform technology with multiple applications
- Good science

The Board expressed concerns as follows:

- Commercialization potential could be better explained.

#09-23 WiMAX-Based Relay Node with Smart Adaptive Antennas for Mesh Networking

Jian Tang – Department of Computer Science – Montana State University – Bozeman
\$236,880

The Board liked this project because:

- Clear objectives
- Novel research
- Significant leap for wireless
- Good possibility for Montana jobs

The Board expressed concerns as follows:

- Significant funding request

#09-24 A Novel Snow Depth Sensor for Snow Depth and Structure Measurements

Richard Wolff – Department of Electrical & Computer Engineering – Montana State
University – Bozeman
\$202,995

The Board liked this project because:

- Value of remote sensors

The Board expressed concerns as follows:

- Is there a more valuable application for this technology?

#09-25 Commercialization of Clean Coal and Geologic Carbon Sequestration in

Montana: Detailed Site Characterization of Kevin Dome and Enhanced Oil Recovery
Opportunities along the Sweetgrass Arch

David Bowen – Big Sky Carbon Sequestration Partnership – Montana State University –
Bozeman
\$349,049

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The Board liked this project because:

- Addresses carbon sequestration problem

The Board expressed concerns as follows:

- Affordability of building pipelines

#09-26 Control of Microbial Processes for Enhanced Water Treatment Using Floating Island Treatment Systems

Alfred Cunningham – Center for Biofilm Engineering – Montana State University – Bozeman

\$283,020

The Board liked this project because:

- University project
- Commercialization success for Montana

The Board expressed concerns as follows:

- Budget may be reduced.
- Questioned marketing strategy

#09-27 Single Gene Improvements of Elite Montana Winter Wheat Varieties Using Marker-Assisted Selection

Phil Bruckner – Department of Plant Sciences & Plant Pathology – Montana State University – Bozeman

\$114,000

The Board did not show any particular interest in this project.

#09-28 MEMS Variable Focus Lens: Technology Development for Commercial Applications in Medical Imaging and Consumer Electronics

David Dickensheets – Montana Microfabrication Facility – Montana State University – Bozeman

\$150,000

The Board liked this project because:

- Direct commercialization with local companies
- Process development specific to MEMS technology
- Appears to be unique synergy in local collaborations

The Board did not express any particular concerns with this project.

#09-29 New Genetically-Engineered Fluorescent Protein with Dramatically-Enhanced Two-Photon Brightness

Mikhail Drobizhev – Department of Physics – Montana State University – Bozeman

\$60,000

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The Board liked this project because:

- Potential commercialization path
- Technology is working
- Potential in broad array of arenas
- Fairly inexpensive
- Enhances work already being done

The Board expressed concerns as follows:

- Desirability of the project as compared to other proposals

#09-30 Functional Analysis of Genes Controlling Malting Barley Grain Protein Concentration

Andreas Fischer – Department of Electrical & Computer Engineering - Montana State University – Bozeman
\$231,601

The Board liked this project because:

- Previous funding has brought significant revenues to Montana.

The Board expressed concerns as follows:

- Project has been previously funded.
- Significant funding request

#09-31 Development of Direct Magnetic Field Direct Current (DMFDC) Motor Drive
Hongwei Gao – Department of Electrical & Computer Engineering – Montana State University – Bozeman
\$128,020

The Board liked this project because:

- Will either work, or it won't – not much in between
- High commercialization potential
- Near-term
- Potential to be very revolutionary product

The Board expressed concerns as follows:

- Intellectual Property protection
- Will it be manufactured offshore?

#09-32 Advancing Malting and Feed Quality in Barley

Mike Giroux – Department of Plant Sciences & Plant Pathology – Montana State University – Bozeman
\$140,996

The Board liked this project because:

- Standard commercialization route for MSU agricultural research

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The Board expressed concerns as follows:

- Has been funded previously

#09-33 Research Support for Standardizing a Comprehensive Biofilm Efficacy Test System

Darla Goeres – Center for Biofilm Engineering - Montana State University – Bozeman
\$133,970

The Board liked this project because:

- Credibility of PI
- Good track record in commercialization previous research
- Collaboration with local company that is selling products resulting from previous research

The Board expressed concerns as follows:

- Why hasn't this been developed before?

#09-34 Disbursed Wind Generation to Enhance Agricultural Economic Vitality through Leveraging Existing Electrical System distribution Capabilities

Ron Cooper – Mountaintop Associates, Inc. – Bozeman
\$249,434

The Board expressed concerns as follows:

- Proposal could have been more clearly written, and could have provided more information and data.

#09-35 New Fluorescent Biosensors for Drug Discovery

Anne Marie Quinn – Montana Molecular – Bozeman
\$75,000

The Board liked this project because:

- Rapid time to market from license to production
- Collaboration with university and private company
- Good overlap with other local instrumentation companies
- Relatively inexpensive project

The Board expressed no particular concerns regarding this project.

The Board requested a presentation.

IV. Adjournment

The meeting adjourned at 4:02 p.m.

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Board Members Attending:

John Youngberg, Chairman
Marty Connell
Jim Davison
Michael Dolson
Todd Graetz
Larry Hall

Others Attending:

Dave Desch, Executive Director
Jane Todd, Administrative Specialist

I. Call to Order

Chairman John Youngberg called the meeting to order at 8:35 a.m.

II. Continue Review and Discussion of Proposals Submitted March 3rd

#09-36 Photodynamic Therapy in the Treatment of Cancers in Companion Animals:
Addressing a Huge Unmet Need
Charles Spangler – MPA Technologies, Inc. – Bozeman
\$94,000

The Board liked this project because:

- High commercialization potential
- Near-term to market
- Good track record with PI

The Board expressed concerns as follows:

- May be more significant proposals to be considered for funding, e.g., human therapies

#09-38 Conjugate Vaccines to Prevent Shigellosis
Gary Gustafson – EndoBiologics Inc. – Missoula
\$199,027

The Board liked this project because:

- Addresses a significant worldwide problem

The Board expressed concerns as follows:

- Previously funded
- Limited potential for manufacturing in Montana

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- Should be able to get other funding
- Significant portion of budget is for indirect costs

#09-39 Huntite Crystals for UV Nonlinear Optics and Self-Frequency Doubled Lasers
Gregory Peterson – Pinyon Photonics Corporation – Bozeman
\$130,780

The Board liked this project because:

- Relatively near-term
- Low to medium risk
- Significant market
- Relatively inexpensive

The Board expressed concerns as follows:

- Is this a process-driven project?
- Matching funds in the way of individual line of credit – company must be very new

#09-40 Resource Assessment of Deep Coals in Eastern Montana: Potential Targets for Commercialization by In-Situ Gasification
Jay Gunderson – Montana Bureau of Mines and Geology – Billings
\$149,334

The Board liked this project because:

- In-situ gasification is timely.
- University coal project
- Project location in Billings
- May make economic sense for Montana

The Board expressed concerns as follows:

- What is the real need for this?
- Why hasn't this already been figured out?
- Philosophical question as far as coal being a resource from which Montana can profit
- Great Northern Properties should contribute more to the project.

#09-41 Evaluation of Safflower and Other Specialty Oilseed Crops for Biodiesel/Biobased/Food/Livestock Feed Value-Added Products in Montana
Jerald Bergman – Eastern Agricultural Research Center – Montana State University – Bozeman
\$82,500

The Board liked this project because:

- Location in Sidney
- Fairly inexpensive
- Portion of match from private industry

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The Board expressed concerns as follows:

- Research is not particularly novel.

#09-42 Direct Coal Liquefaction Research Proposal

Paul Gannon – Chemical & Biological Engineering Department - Montana State University – Bozeman
\$300,000

The Board liked this project because:

- University project

The Board expressed concerns as follows:

- Collaborating company headquarters are not in Montana.
- Request is large; expensive project.
- Other energy projects may be more attractive for the program

#09- 43 Developing Laboratory Applications for Inhibitors of Fungal Morphogenesis

Kurt Toenjes – Department of Biological & Physical Sciences – Montana State University – Billings
\$250,397

The Board liked this project because:

- Project has worldwide significance.
- Research project from MSU-Billings

The Board expressed concerns as follows:

- FDA approval

#09-44 A New Agrichemical Biosensor

Charles Thompson – ATERIS Technologies, LLC – Missoula
\$331,200

The Board liked this project because:

- Commercialization potential
- Potential for broad applications
- Credibility of PI and Co-PI
- Spin-off from COBRE project

The Board expressed concerns as follows:

- Expensive project – budget questions

#09-46 Montana Compress-Air Energy Storage Project: Air Storage Research to Support Commercialization

Michael King – Gaelectric LLC/The Hydrodynamic Group – Great Falls/Edmonds, WA
\$135,202

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The Board liked this project because:

- Renewable resource project
- Not asking for a lot of money
- Development in Huntley field
- Intriguing project

The Board expressed concerns as follows:

- Budget questions
- Home office is not in Montana.

The Board requested a presentation.

#09-47 Development of Germination Techniques for *Carex*, *Scripus*, and *Eleocharis Species*

Tim Meikle – Great Bear Restoration – Hamilton

\$39,234

The Board liked this project because:

- Low risk
- Near-term commercialization
- Not asking for a lot of money
- Company has the expertise

The Board expressed no particular concerns regarding this project.

#09-48 The Solar Bug™

Steven Titus – Free Drive EV, Inc. – Bozeman

\$150,000

The Board liked this project because:

- Solar-powered commuter
- Existing prototypes
- Interesting technology

The Board expressed concerns as follows:

- Market not clear
- Efficiency of systems
- No matching funds
- Capital-intensive business
- Specialty application

#09-49 A Revolutionary Position Sensing Device

Randy Reibel – Bridger Photonics, Inc. – Bozeman

\$150,000

The Board liked this project because:

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- Market potential
- Near-term commercialization

The Board expressed concerns as follows:

- Project may need more funding than requested to be successful.

#09-50 Advanced Laser for Materials Processing and Sensing

Peter Roos – Bridger Photonics, Inc. – Bozeman

\$150,000

The Board liked this project because:

- Enabling technology with many applications

The Board expressed concerns as follows:

- Budget questions

#09-51 Preclinical Development of Low Dose Methamphetamine as a Neuroprotective Agent Following Stroke and Traumatic Brain Injury

David Poulsen – Montana Neuroscience Institute – University of Montana – Missoula

\$202,790

The Board liked this project because:

- Previous project is going well.
- FDA has already approved use of methamphetamine in certain applications.
- Spin-off from NIH COBRE project
- Cutting-edge research

The Board expressed no particular concerns regarding this project..

#09-52 Commercial Production of Neuroscience Research Reagents

Michael Kavanaugh – Department of Biomedical Pharmaceutical Sciences – University of Montana – Missoula

\$154,000

The Board liked this project because:

- Near-term commercialization

The Board expressed concerns as follows:

- Lack of significant research component
- Approval of patent application enjoins Sigma from selling without a license – what happens if patent is not granted?

#09-53 Positioning Montana for Leadership in Biomass Conversion: Enhancing Cellulosic Biofuels Production via Immobilized Fusant Yeast

Frank Rosenzweig – Division of Biological Sciences – University of Montana – Missoula

\$89,968

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The Board liked this project because:

- Cellulosic fuels will become increasingly important.
- Strong peer reviews

The Board expressed concerns as follows:

- Weak commercialization plan
- Other institutions are spending millions of dollars on this type of research

#09-54 Characterization and Optimization of a Nanoparticulate Mediated Bacterial Transformation System with Immediate Market Potential

Rajendra Kasinath – Montana Tech of The University of Montana – Butte
\$80,868

The Board liked this project because:

- Intriguing project
- Positive aspect of non-typical bioscience being done at Montana Tech

The Board expressed concerns as follows:

- Short on matching funds

#09-55 Improving Agricultural and Municipal Cellulose Waste Degradation for Production of Biofuels by Developing New Z dye Differential Activity-Based Proteomic Tools

Don Thorne – Z dye LLC – Gallatin Gateway
\$400,000

The Board liked this project because:

- Interesting process
- Biomass industry production and use of agriculturally marginal land

The Board expressed concerns as follows:

- Asking for a lot of money
- Previous multiple funding

#09-56 Research and Commercialization of the SepticNET™ Nutrient Removal Technology

Steven Anderson – Water & Environmental Technologies – Butte
\$187,038

The Board liked this project because:

- Technology is needed.

The Board expressed concerns as follows:

- Matching funds budget
- Peer reviews discuss the need, but do not address the science.
- Budget

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- How competitive will this be compared to other options?

The Board requested a presentation.

#09-57 Development and Commercialization of a Biomass Based Photobioreactor for CO₂ Sequestration with Applications in Clean Coal Energy Production
David Tooke – Sustainable Systems – Missoula
\$375,000

The Board liked this project because:

- Novel project if a large enough facility can be built.
- Successful track record in previous project
- Different approach to carbon sequestration

The Board expressed concerns as follows:

- Are there good uses for the huge amounts of algae produced?

#09-58 Enhancement of Montana Coal to Support Future Expansion Advanced Coal Characterization
Paul Miranda – Center for Advanced Mineral & Metallurgical Processing – Montana Tech – Butte
\$48,080

The Board liked this project because:

- Using innovative technologies to characterize Montana coal makes sense.

The Board expressed concerns as follows:

- Did not interest the Board relative to other projects.

#09-59 Enhancement of Montana Coal to Support Future Expansion Sodium Removal Technology Development
Corby Anderson – Center for Advanced Mineral & Metallurgical Processing - Montana Tech – Butte
\$347,960

The Board liked this project because:

- Evaluation and development of sodium removal and recovery technologies is important.

The Board expressed concerns as follows:

- Asking for a lot of money
- May be other coal-related projects that are more attractive.

#09-61 Commercialization of Low Vibration Cryocooler Technology
Luke Mauritsen – S2 Corporation – Bozeman
\$116,075

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The Board liked this project because:

- Proposes an improvement on existing systems – the project is doable.

The Board expressed concerns as follows:

- Market size may be limited.

#09-62 Commercialization of Clean Coal Production of Methane and Humic Acid: Stage I

Paul Gatzemeier – Coal Black Liquids – Billings
\$510,000

The Board liked this project because:

- Interesting project
- Credibility of the PI in the industry
- Unique use of coal

The Board expressed concerns as follows:

- Large budget request
- Status of licensing agreement
- Many components of the project not related to research

The Board requested a presentation from the PI and also wants to see the licensing agreement.

#09-63 Development of Estolides as Biolubricant and Cold-Flow Improver for Biodiesel
Nester Soriano, Jr. – Bio-Energy Innovation & Testing Center – MSU-Northern – Havre
\$260,277

The Board liked this project because:

- Location of project at MSU-Northern in Havre

The Board expressed no particular concerns regarding the project.

IV. Public Comment

There was no public comment.

V. Adjournment

Marty Connell moved to adjourn the meeting. Todd Graetz seconded the motion and the meeting adjourned at 2:27 pm.

Respectfully submitted,

John Youngberg, Chairman